HP Single Channel Ultra320 SCSI Host Bus Adapter G2 User Guide

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About This Guide

This guide provides step-by-step instructions for installation and reference information for operation for the HP Single Channel Ultra320 SCSI Host Bus Adapter G2.

Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots servers. HP assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

⚠ Important Safety Information

Before installing this product, read the *Important Safety Information* document included with the server.

Symbols on Equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions:

WARNING: This symbol, in conjunction with any of the following symbols, indicates the presence of a potential hazard. The potential for injury exists if warnings are not observed. Consult your documentation for specific details.

This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.

This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason.

WARNING: To reduce the risk of injury from electric shock hazards, do not open this enclosure.

This symbol on an RJ-45 receptacle indicates a network interface connection.

WARNING: To reduce the risk of electric shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.

WARNING: To reduce the risk of injury from a hot component, allow the surface to cool before touching.

These symbols, on power supplies or systems, indicate that the equipment is supplied by multiple sources of power.

WARNING: To reduce the risk of injury from electric shock, remove all power cords to completely disconnect power from the system.

This symbol indicates that the component exceeds the recommended weight for one individual to handle safely.

Weight in kg
Weight in lb

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

Rack Stability

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- **The leveling jacks are extended to the floor.**

- **The full weight of the rack rests on the leveling jacks.**

- **The stabilizing feet are attached to the rack if it is a single-rack installation.**

- **The racks are coupled together in multiple-rack installations.**

- **Only one component is extended at a time. A rack may become unstable if more than one component is extended for any reason.**

Symbols in Text

These symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life.

CAUTION: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or loss of information.

IMPORTANT: Text set off in this manner presents essential information to explain a concept or complete a task.

NOTE: Text set off in this manner presents additional information to emphasize or supplement important points of the main text.

Getting Help

If you have a problem and have exhausted the information in this guide, you can get further information and other help in the following locations.

Technical Support

In North America, call the HP Technical Support Phone Center at 1-800-HP-INVENT. This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored. Outside North America, call the nearest HP Technical Support Phone Center. Telephone numbers for worldwide Technical Support Centers are listed on the HP website at http://www.hp.com.

Be sure to have the following information available before you call HP:

- Technical support registration number (if applicable)

- Product serial number

- Product model name and number

- Applicable error messages

- Add-on boards or hardware

- Third-party hardware or software

- Operating system type and revision level

HP Website

The HP website has information on this product as well as the latest drivers and flash ROM images. You can access the HP website at http://www.hp.com.

Authorized Reseller

For the name of your nearest authorized reseller:

- In the United States, call 1-800-345-1518.

- In Canada, call 1-800-263-5868.

- Elsewhere, see the HP website for locations and telephone numbers.

Reader's Comments

HP welcomes your comments on this guide. Please send your comments and suggestions by email to `ServerDocumentation@hp.com`.

1

Introduction

The HP Single Channel Ultra320 SCSI Host Bus Adapter (HBA) G2 contains one independent low-voltage differential SCSI (LVDS) channel that interfaces directly between the server PCI or PCI-X local bus and up to 15 SCSI devices. The adapter supports industry-standard interfaces and protocols. The Single Channel Ultra320 SCSI HBA G2 can be used with all SCSI devices, including Ultra320 SCSI, Ultra160 SCSI, Ultra2 SCSI, and Ultra SCSI. For optimum performance and throughput, the SCSI HBA card must be installed in a 64-bit, 133-MHz, PCI-X slot with Ultra320 devices.

Features

Standard SCSI features of the Single Channel Ultra320 SCSI HBA G2 include:

- Support of Ultra320 and legacy modes and devices, including single-ended (SE) or multimode low-voltage differential (LVD) devices (high-voltage differential [HVD] devices are *not* supported)

- One bootable SCSI channel

- SCSI data transfers up to 320 MB/s

- Narrow or Wide SCSI data path

- Single independent channel that allows LVD and SE devices to operate separately at peak performance

- Automatic detection and communication with Ultra320 SCSI, Ultra160 SCSI, Ultra2 SCSI, and Ultra SCSI

- One 68-pin wide SCSI internal connector that supports Ultra320 SCSI, Ultra160 SCSI, Ultra2 SCSI, and Ultra SCSI

- One Very High-Density Cable Interconnect (VHDCI) external connectors that support Ultra320 SCSI, Ultra160 SCSI, Ultra2 SCSI, and Ultra SCSI

PCI/PCI-X Features

- PCI-X 1.0 and PCI 2.2 compliance

- PCI-X compatibility with 32- and 64-bit, 50–133 MHz slots

- PCI compatibility with 32- and 64-bit 5-V/33-MHz and 3.3-V/66-MHz slots

- Half-size form factor that occupies a single 64-bit universal PCI-X slot

- Streaming PCI-enhanced memory data read and write commands

- PCI bus address and data parity generation and checking

Ultra320 HBA Support

The Single Channel Ultra320 SCSI HBA G2 provides 64-bit PCI-X bus master operation and SCSI data transfer rates of up to 320 MB/s, provided that all components are Ultra320 capable. This combination allows high throughput in many network application environments, including resource sharing, database servicing, and high-performance backup solutions.

The adapter also supports bus mastering, split completion responses, message-signaled interrupts, scatter/gather caching, and broad range of direct memory access (DMA) capabilities. This HBA supports all SCSI functions supported by the previous HP Single Channel Ultra320 SCSI HBA.

The Single Channel Ultra320 SCSI HBA G2 is compatible with SPI-4 and PCI-X specifications and incorporates latest developments in Ultra320 SCSI technology, offering twice the performance of previous Ultra160 products.

SCSI Connectors

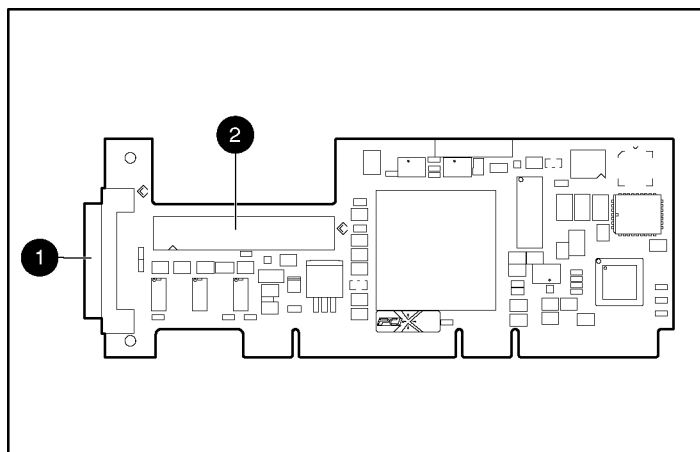The Single Channel Ultra320 SCSI HBA G2 has the following connectors:

Figure 1-1: Single Channel Ultra320 SCSI HBA G2

Item	Description
1	External VHDCI connectors
2	Internal wide SCSI connector

The external connector is standard VHDCI connectors and mounted on the slot panel and accessible through the back of the server. Screwlocks are provided on the external SCSI cables to secure them to the VHDCI connectors.

Port Assignments

This adapter has one channel (Channel A) that supports one internal wide SCSI connector and one external VHDCI connector. This arrangement enables direct connection to the channel using existing or commonly available cables.

SCSI IDs

The Single Channel Ultra320 SCSI HBA G2 contains one SCSI bus that supports up to 15 peripherals. Channel A has internal and external connectors. The peripherals on the bus must have a unique SCSI ID ranging from 6 to 0, then 15 to 8, with 6 being the highest priority and 8 being the lowest priority. SCSI IDs on all peripherals must be either manually set with switches or jumpers on the device itself or automatically set on HP products that support hot-pluggable drives. The SCSI IDs determine the priority of the peripheral device when attempting to access the SCSI bus. The server assigns the SCSI adapter to the highest priority by setting the ID of the adapter to 7.

For maximum performance, if both low- and high-throughput devices must be connected to the same bus, assign the low-throughput devices a higher SCSI ID priority. This configuration allows the low-throughput devices access to the bus.

Multiple Adapter Installation

The following considerations apply when you install more than one
Single Channel Ultra320 SCSI HBA G2:

- Each adapter has one independent SCSI channel that supports up to 15 devices.

- Each SCSI channel has its own set of unique SCSI IDs (from 6 to 0, 15 to 8). Each
  peripheral on a bus must be assigned its own unique ID.

SCSI Termination

All SCSI buses require termination on both ends of the bus to prevent signal degradation. The
Single Channel Ultra320 SCSI HBA G2 supplies the termination on the adapter end of the
SCSI bus. Hot-plug drives do not require terminators on the ribbon cable because terminators
are included on the drive backplane. Nonhot-plug internal drives require terminators on the
ribbon cable. Individual SCSI devices in HP servers should not contain bus termination.

Ultra320, Ultra2, and Ultra SCCI require multimode or LVD-only terminators (rather than
SE-only terminators used with Wide Ultra SCSI-3, Fast Wide SCSI-2, and Fast SCSI-2).

External SCSI buses must also be terminated. This termination is supplied in HP external
storage systems. Individual SCSI devices in HP storage systems should not contain bus
termination.

> **CAUTION:** To prevent boot error messages, the integrated SCSI controller on the system
> board of the server must be terminated at all times. If a Single Channel Ultra320 SCSI HBA
> G2 is replacing the integrated controller, a terminated SCSI ribbon cable connected to the
> system board should be left, even if there are no SCSI devices attached to this cable.

SCSI Cables

Cables are provided with most HP server products that require cabling. If additional cables are needed or the correct one was not provided with the server product, they can be ordered from an authorized HP reseller or authorized HP Service Provider. Refer to Table 1-1 for cable option kit part numbers.

Table 1-1: External Cable Option Kit Part Numbers

Cable Option Kit	Part Number
VHDCI to Wide 6 foot	341176-B21
VHDCI to Wide 12 foot	341177-B21
VHDCI to VHDCI 6 foot	341174-B21
VHDCI to VHDCI 12 foot	341175-B21

Note: An internal 68-pin to 50-pin SCSI adapter (part number 199618-001) is also available.

If the option kit part number for the cable needed is not listed here, or for additional ordering information, refer to the HP website at http://www.hp.com.

SCSI Cable Connectors

To identify the various SCSI cables required in a Single Channel Ultra320 SCSI HBA G2 installation in the various configurations of HP servers, refer to Figure 1-2.

Keep these characteristics of SCSI cables in mind:

- External VHDCI cables have a round wire with securable connectors, and the connector heads are smaller than 68-pin external wide SCSI connector heads.

- Internal SCSI cables have a flat ribbon cable with push-on connectors.

- HP SCSI cables are keyed so they cannot be installed incorrectly.
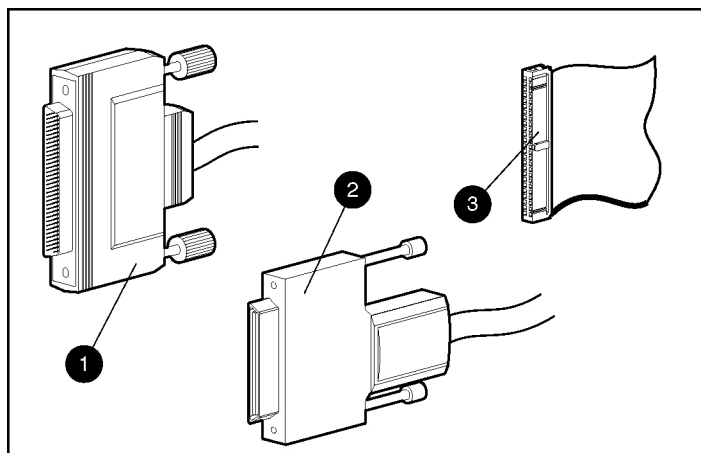
Figure 1-2: Identifying SCSI cable connectors

Item	Description
1	External 68-pin wide SCSI connector
2	External VHDCI SCSI connector
3	Internal 68-pin wide SCSI connector

2

Installing the Hardware

This chapter discusses the installation of the HP Single Channel Ultra320 SCSI HBA G2 in an HP server.

⚠️ **WARNING: To reduce the risk of personal injury from electric shock and hazardous energy levels, only authorized service technicians should attempt to install this equipment. Consult the safety information and user documentation provided with the computer before attempting this installation.**

Many servers are capable of producing energy levels that are considered hazardous and are only intended to be serviced by qualified personnel trained in dealing with these hazards. Do not remove enclosures or attempt to bypass any interlocks that may be provided for the purpose of removing these hazardous conditions.

Items Needed

- Torx T-15 screwdriver
- HP PCI-X U320 HBA Support Software CD or the SmartStart and Support Software CD
- Documentation that came with the server

Preparing the Server

Use the following general guidelines to prepare the server for installation of the Single Channel Ultra320 SCSI HBA G2.

⚠️ **WARNING: When working with equipment installed in a rack, be sure that the equipment and rack are stable before beginning.**

To prepare the server:

1. Perform a normal system shutdown.
2. Power down the server.
3. Power down all peripheral devices attached to the server.
4. Unplug the AC power cord from the outlet, and then unplug it from the server.
5. Disconnect all peripheral devices attached to the server.

Opening the Server

Before installing the Single Channel Ultra320 SCSI HBA G2, open the server and gain access to the PCI/PCI-X bus expansion slots. For instructions on opening the server and accessing the PCI/PCI-X slots, refer to the documentation that came with the server.

After the PCI/PCI-X slots have been accessed, proceed to the next section, "Installing the Single Channel Ultra320 SCSI HBA G2."

Installing the Single Channel Ultra320 SCSI HBA G2

Use the following general guidelines to install the Single Channel Ultra320 SCSI HBA G2 in a server.

> **WARNING: To reduce the risk of personal injury from hot surfaces, allow the internal system components to cool before touching.**

> **CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Be sure the user is properly grounded before beginning this procedure. Refer to Appendix B for ESD information.

1. Locate the PCI/PCI-X bus expansion slots. Refer to the documentation that came with the server for the specific location of these slots.

2. Depending on the server model, remove the retaining screw or open the expansion slot latches that secure the PCI/PCI-X slots.

3. Remove the slot cover from the PCI/PCI-X slot. Save the protective cover to use if the slot becomes empty.

4. Install the adapter into the PCI/PCI-X slot, and press it firmly into place. The contacts on the adapter edge should be fully seated in the system board connector.

5. Depending on the server model, secure the adapter by replacing the retaining screw or by closing the slot latch.

To connect the adapter to other devices, proceed to the next section, "Cabling the Single Channel Ultra320 SCSI HBA G2."

Cabling the Single Channel Ultra320 SCSI HBA G2

The Single Channel Ultra320 SCSI HBA G2 can be connected to external SCSI devices or to internal SCSI devices (located in the server). The following sections provide cabling information for both external and internal connections.

IMPORTANT: All SCSI devices (except CD-ROM drives) that are on the same SCSI bus must be either internal to the server or in an external storage system, but not both. When using both internal and external SCSI devices, connect each type to a separate port.

External SCSI Connections

To connect the Single Channel Ultra320 SCSI HBA G2 to SCSI devices located outside the server, you need one external SCSI cable for each channel to which it is connected.
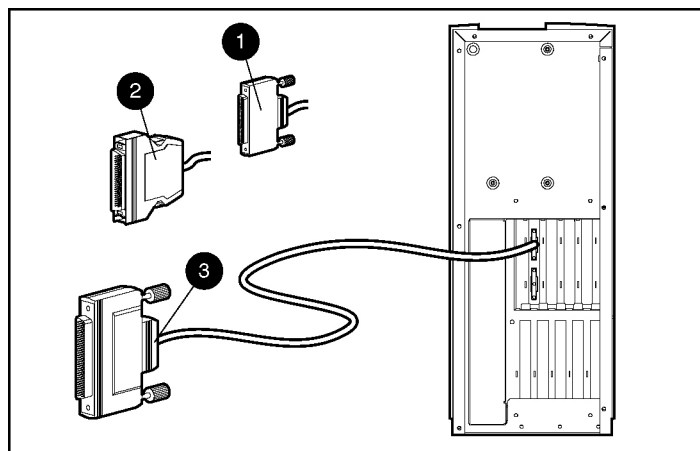

Figure 2-1: External SCSI cabling on an HP server

Item	Description
1	VHDCI-VHDCI cable
2	External VHDCI-to-narrow SCSI cable
3	External VHDCI-to-Wide SCSI cable

To connect to an Ultra320 or an Ultra160 SCSI peripheral, use a VHDCI-VHDCI cable. To connect to a Fast SCSI-2 peripheral, use an external VHDCI-to-narrow SCSI cable. To connect to a Fast Wide SCSI-2 or Wide Ultra SCSI-3 peripheral, use an external VHDCI-to-Wide SCSI cable.

If these cables are not furnished with the HP external SCSI device, you might be able to obtain them from an authorized HP reseller. Refer to "SCSI Cables" in Chapter 1 for more information.

To attach the cable:

1. Attach the appropriate end of the cable to the external peripheral according to the instructions that came with the device. Be sure to secure the thumbscrews.

2. Attach the VHDCI end of the cable to the adapter and secure the thumbscrews.

After the cabling is complete, proceed to "Completing the Installation" in this chapter.

Internal SCSI Connections

Use the information in this section to connect the Single Channel Ultra320 SCSI HBA G2 to internal SCSI devices. The most common cabling scenarios include:

- Placing hard drives or other devices on a separate SCSI bus

- Replacing the integrated SCSI controller with Single Channel Ultra320 SCSI HBA G2

- Connecting additional internal SCSI devices

> **CAUTION:** If the server has an integrated Ultra320 SCSI controller, the controller must be terminated at all times to prevent boot error messages.

IMPORTANT: To run in LVD mode (Ultra320 or Ultra160), all components, including the ribbon cable, must be LVD capable.

Replacing the Integrated SCSI Controller

Use the following guidelines to replace the integrated SCSI controller with the Single Channel Ultra320 SCSI HBA G2:

1. Unplug the original SCSI cable from the system board.

2. Plug the SCSI cable into the appropriate connector on the Single Channel Ultra320 SCSI HBA G2.

   IMPORTANT: Do not connect SCSI cables to both internal and external connectors from the same port. If both SE and LVD devices are in the server, use a separate port for each.

   For more information on connecting cables, refer to "Cabling the Single Channel Ultra320 SCSI HBA G2" in this chapter.

3. Depending on the server model, the cable might need to be secured by clipping it to another component in the server. Refer to the system documentation for specific instructions on internal cabling.

The Single Channel Ultra320 SCSI HBA G2 now supports the internal SCSI devices. The integrated controller on the system board can be used to support other SCSI devices. If the integrated controller is not being used to support other SCSI devices, it must be terminated. Proceed to "Completing the Installation" in this chapter.

Connecting Additional Internal SCSI Devices

Use the following guidelines to connect new SCSI devices to the Single Channel Ultra320 SCSI HBA G2. To perform this procedure, an additional SCSI cable is needed for each type of device that is connecting to the Single Channel Ultra320 SCSI HBA G2.

1. Install the additional SCSI devices in the server. Refer to the documentation provided with the system for specific installation instructions.

2. Plug the new cables into the appropriate connectors on the Single Channel Ultra320 SCSI HBA G2.

3. Route the cables according to the instructions in your server documentation.

4. Attach the cables to the new SCSI devices. Proceed to "Completing the Installation" in this chapter.

Completing the Installation

After all cabling and connections have been completed, reassemble the server by following these guidelines:

1. Be sure all cables are routed correctly and are not restricting or being pinched by other components. Refer to the server documentation for proper routing of the cables for the server model.

2. Reconnect any peripheral devices to the server.

3. Plug the AC power cord into the server, then into a grounded AC outlet.

4. Turn on any peripheral devices attached to the server.

5. Turn on the server.

Updating the Firmware and Installing the Drivers

Software drivers must be installed in the server to enable communication between the processor and the new Single Channel Ultra320 SCSI HBA G2. Some HP servers also require updated system ROM firmware before they can take advantage of the new features of Single Channel Ultra320 SCSI HBA G2. HP recommends running the System ROMPaq Utility to be sure your server has the latest ROM version. For more information, refer to "Upgrading the System ROM" in Chapter 3.

Proceed to Chapter 3, "Installing the Firmware and Software," to install the necessary drivers for the operating system and model.

3

Installing the Firmware and Software

After the HP Single Channel Ultra320 SCSI HBA G2 has been installed in the server, complete the installation by upgrading the system ROM (if necessary) and installing the new drivers for the operating system. Follow the procedures outlined in the Support Software documentation included in the kit.

A

Regulatory Compliance Notices

Regulatory Model Number

For the purpose of regulatory compliance certifications and identification, this product has been assigned a unique regulatory model number. The regulatory model number can be found on the product nameplate label, along with all required approval markings and information. When requesting compliance information for this product, always refer to this regulatory model number. The regulatory model number is not the marketing name or model number of the product.

Federal Communications Commission Notice

Part 15 of the Federal Communications Commission (FCC) Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference-free radio frequency spectrum. Many electronic devices, including computers, generate RF energy incidental to their intended function and are, therefore, covered by these rules. These rules place computers and related peripheral devices into two classes, A and B, depending upon their intended installation. Class A devices are those that may reasonably be expected to be installed in a business or commercial environment. Class B devices are those that may reasonably be expected to be installed in a residential environment (for example, personal computers). The FCC requires devices in both classes to bear a label indicating the interference potential of the device as well as additional operating instructions for the user.

The FCC rating label on the device shows the classification (A or B) of the equipment. Class B devices have an FCC logo or FCC ID on the label. Class A devices do not have an FCC logo or FCC ID on the label. After the Class of the device is determined, refer to the corresponding statement in the following sections.

Class A Equipment

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Class B Equipment

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit that is different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for help.

Declaration of Conformity for Products Marked with the FCC Logo, United States Only

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

For questions regarding your product, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 530113
  Houston, Texas 77269-2000

- 1-800-652-6672 (For continuous quality improvement, calls may be recorded or monitored.)

For questions regarding this FCC declaration, contact us by mail or telephone:

- Hewlett-Packard Company
  P. O. Box 692000, Mail Stop 510101
  Houston, Texas 77269-2000

- 1-281-514-3333

To identify this product, refer to the part, series, or model number found on the product.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Hewlett-Packard Company may void the user's authority to operate the equipment.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

Canadian Notice (Avis Canadien)

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Class B Equipment

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Regulatory Notice

CE

This product complies with the following EU Directives:

• Low Voltage Directive 73/23/EEC

• EMC Directive 89/336/EEC

CE Compliance of this product is valid only if powered with the correct HP-provided and CE marked AC adapter.

If this product has telecommunication functionality, it also complies with the essential requirements of:

• R&TTE Directive 1999/5/EC

CE(XXXX*)①

*For a notified body number refer to the product regulatory label.

Compliance with these directives implies conformity to harmonized European standards (European Norms), which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

The telecommunications functionality of this product may be used in the following EU and EFTA countries:

Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and United Kingdom.

Notice for Use in France and Italy

Italy:

E'necessaria una concessione ministeriale anche per l'uso del prodotto. Verifici per favore con il proprio distributore o direttamente presso la Direzione Generale Pianificazione e Gestione Frequenze.

License required for use. Verify with your dealer or directly with General Direction for Frequency Planning and Management (Direzione Generale Pianificazione e Gestione Frequenze).

France:

L'utilisation de cet equipement (2.4GHz Wireless LAN) est soumise a certaines restrictions: Cet equipement peut etre utilise a l'interieur d'un batiment en utilisant toutes les frequences de 2400 a 2483.5MHz (Chaine 1-13). Pour une utilisation en environement exterieur, vous devez utiliser les frequences comprises entre 2454-2483.5MHz (Chaine 10-13). Pour les dernieres restrictions, voir http://www.art-telecom.fr.

For 2.4 GHz Wireless LAN operation of this product certain restrictions apply: This product may be used indoor for the entire 2400-2483.5 MHz frequency band (channels 1-13). For outdoor use, only 2454-2483.5 MHz frequency band (channels 10-13) may be used. For the latest requirements, see http://www.art-telecom.fr.

Notice for products incorporating 5GHz Wireless LAN devices

Frequency availability for 802.11a or 802.11h Wireless LAN is not currently harmonized throughout the European Union. For compliance requirements, users should verify with their supplier, local HP office or Telecommunications authority.

Japanese Notice

ご使用になっている装置にVCCIマークが付いていましたら、次の説明文を
お読み下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準
に基づくクラスB情報技術装置です。この装置は、家庭環境で使用すること
を目的としていますが、この装置がラジオやテレビジョン受信機に近接して
使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

VCCIマークが付いていない場合には、次の点にご注意下さい。

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に
基づくクラスA情報技術装置です　この装置を家庭環境で使用すると電波
妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ず
るよう要求されることがあります。

Korean Notice

Class A Equipment

> **A**급 기기 (업무용 정보통신기기)
>
> 이 기기는 업무용으로 전자파적합등록을 한 기기이오니
> 판매자 또는 사용자는 이 점을 주의하시기 바라며, 만약
> 잘못판매 또는 구입하였을 때에는 가정용으로 교환하시기
> 바랍니다.

Class B Equipment

> **B**급 기기 (가정용 정보통신기기)
>
> 이 기기는 가정용으로 전자파적합등록을 한 기기로서
> 주거지역에서는 물론 모든지역에서 사용할 수 있습니다.

BSMI Notice

警告使用者：

這是甲類的資訊產品，在居住的環境中使用時，可能
會造成射頻干擾，在這種情況下，使用者會被要求採
取某些適當的對策。

B

Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you must follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor can damage system boards or other static-sensitive devices. This type of damage can reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.

- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

- Place parts on a grounded surface before removing them from their containers.

- Avoid touching pins, leads, or circuitry.

- Be sure you are properly grounded when touching a static-sensitive component or assembly.

Grounding Methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ± 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.

- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.

- Use conductive field service tools.

- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, have an authorized HP reseller install the part.

IMPORTANT: For more information on static electricity, or assistance with product installation, contact your authorized HP reseller.

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